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- Published:**
- *with international search report*
  - *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*
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(54) Title: **MODIFIED CEA NUCLEIC ACID AND EXPRESSION VECTORS**

(57) Abstract: The present invention relates to a nucleic acid encoding a polypeptide and the use of the nucleic acid or polypeptide in preventing and / or treating cancer. The invention relates to improved vectors for the insertion and expression of foreign genes encoding tumor antigens for use in immunotherapeutic treatment of cancer. One such foreign DNA sequence is modified CEA nucleic acid.

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# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/10916

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : A61K 39/275

US CL : 424/232.1

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 424/93.2, 199.1, 232.1; 435/173.3, 320.1, 456; 514/44; 536/23.1, 23.4, 23.5

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
Please See Continuation Sheet

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X — Y	US 5,942,235 A (PAOLETTI et al.) 24 August 1999 (24.08.1999), see claims and abstract.	1-5, 26-35 — 6-25
X — Y	US 5,833,975 A (PAOLETTI et al.) 10 November 1998 (10.11.1998), see claims and abstract.	1-5, 26-35 — 6-25
X — Y	US 5,698,530 A (SCHLOM et al) 16 December 1997 (16.12.1997), see claims.	1-5, 26-35 — 6-25
Y	HODGE et al. A triad of costimulatory molecules synergize to amplify T-cell activation. Cancer Research. 15 November 1999, Vol. 59, No. 22, pages 5800-5807.	1-35

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

26 September 2003 (26.09.2003)

Name and mailing address of the ISA/US

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# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/10916

## Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claim Nos.: 36 and 37  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:  
The claims were not searched because the CRF could not be entered into the database. Therefore, claims limited to SEQ ID NO 24 could not be searched.
3. ☐ Claim Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐  
☐

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.

**INTERNATIONAL SEARCH REPORT**

PCT/US03/10916

**Continuation of B. FIELDS SEARCHED Item 3:**  
WEST, DERWENT, STN-BIOSIS, MEDLINE, EMBASE  
inventor search, carcinoembryonic antigen, CEA, CEA(6D), vector, poxvirus, canarypoxvirus.